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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/738,398

12/17/2003

Yi Sun Chung

CU-3492 RJS

7995

26530

7590

09/29/2005

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EXAMINER

WILSON, CHRISTIAN D

ART UNIT

PAPER NUMBER

2891

DATE MAILED: 09/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/738,398

Applicant(s)

CHUNG, YI SUN

Examiner

Christian Wilson

Art Unit

2891

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Coolbaugh *et al.* in view of Narwankar II *et al.*

Coolbaugh *et al.* (US 2004/0112325) teaches a method of forming a MIM capacitor comprising the steps of forming a via **14** at a first insulating layer **12**, forming a first barrier layer **16** at a surface of the first insulating layer including the via, forming a metal layer **18** on the first insulating layer, forming a capacitor lower electrode layer **60** after forming a second barrier layer **26** and a third barrier layer **50** of tantalum nitride (TaN) [0052] on the metal layer, forming a dielectric layer by oxidizing the capacitor lower electrode layer [0053], forming a capacitor upper electrode layer **66** of TaN [0058] on the dielectric layer, and patterning the capacitor upper electrode layer, dielectric layer, and lower electrode layer [Figure 5D]. Coolbaugh *et al.* does not explicitly discuss opening the via to expose a lower metal wire, but it would have been obvious to one of ordinary skill in the art to use the via to expose a lower metal wire since Coolbaugh *et al.* teaches the underlying substrate can contain an underlying wiring layer [0042] and the resulting damascene structure would provide small feature sizes [0006]. Further, Coolbaugh *et al.* teaches a continuous process method but does not discuss forming the multiple

layers *in situ* without changing equipment. Narwankar II *et al.* (US 6,475,854) teaches a method of forming conductive layers in a capacitor structure where the deposition processes occur in the same chamber [column 9, lines 45-55]. It would have been obvious to one of ordinary skill in the art to form these layers *in situ* without changing equipment since it is Narwankar II *et al.* teaches that continuous *in situ* processing provides prevents undesirable contamination.

Regarding claim 2, Coolbaugh *et al.* further teaches a metal capable of forming a layer with a high dielectric constant [0053].

Regarding claim 5, Coolbaugh *et al.* further teaches a oxidation thickness of 50 – 5000 Å [0052].

3. Claims 3 and 6 – 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Coolbaugh *et al.* as applied to claim 1 above, and further in view of Narwankar *et al.*

Coolbaugh *et al.* does not discuss depositing an amorphous metal layer by sputtering. Narwankar *et al.* (US 6,677,254) teaches a sputtering process to deposit an amorphous TaN layer [Table 2]. It would have been obvious to one of ordinary skill in the art to use the deposition process of Narwankar *et al.* in the method of Coolbaugh *et al.* since this provides a TaN layer with a range of stoichiometric compositions and improved resistivity.

Regarding claims 6 – 8, Coolbaugh *et al.* teaches an anodic oxidation process to form the oxide layer, but does not discuss the particular process parameters. Narwankar *et al.* teaches an oxygen plasma treatment process with a power of 1400 – 4500 W [column 8, line 57; column 11, lines 10-20]. It would have been obvious to one of ordinary skill in the art to use the oxidation process of Narwankar *et al.* in the method of Coolbaugh *et al.* since this method provides a means of optimizing the yield while reducing the thermal budget.

Response to Arguments

4. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian Wilson whose telephone number is (571) 272-1886. The examiner can normally be reached on weekdays, 7:30 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on (571) 272-1722. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2891

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'CDW', with a large, stylized loop at the end.

Christian Wilson, Ph.D.
Primary Examiner
Art Unit 2891

CDW